

Applicant: Yueh-Chang Chen
Application No.: 10/714,771

Amendments to the Drawings:

The attached replacement sheet of drawings includes changes to Figure 5. This sheet, which includes Figure 5, replaces the original sheet including Figure 5. In Figure 5, previously omitted lines have been added as required by the Examiner.

REMARKS/ARGUMENTS

Claims 1-24 are currently pending in this application. In the Present Reply, the Applicant amends claims 1, 14, and 20 to more particularly and distinctly claim the subject matter regarded as the invention. The Applicant submits that no new matter has been introduced into the application by this amendment.

Rejection under 37 CFR 1.84(p)(4)

In the Office Action, Fig. 5 is objected to under 37 CFR 1.84(p)(4) because the reference character “Input signal” has been used to designate one of the inputs of both First Multiplexer 51 and Multiplexer 55, and the reference characters “Actual Gain” and “Signal-Energy” have both been used to designate the output of IIR Filter 53.

According to the descriptions in Paragraphs [0050] and [0051], the input signal is multiplied by the actual gain through Multiplier 55 for generating an output signal, where this input signal denotes the same input signal received by First Multiplexer 51. Therefore, the reference character “Input signal” designating the input of Multiplier 55 is removed, and the reference character “Input signal” designating the input of First Multiplexer 51 is amended as the input of Multiplexer 55 as well. Besides, it is also described in the specification that the IIR Filter 53

performs the calculation process so as to produce both the actual gain and the signal-energy. Thus, the reference characters "Actual Gain" and "Signal-Energy" are amended to designate two separate outputs of IIR Filter 53.

Rejection under 35 U.S.C. §102

In the Office Action, Claims 14 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Strolle et al. (US 6,005,640); and Claim 20 is rejected under 35 U.S.C. 102(e) as being anticipated by Isabelle (US 6,397,177).

After carefully reviewing the respective references US 6,005,640 and US 6,397,177, the applicant respectfully submits that those references do not disclose the technical features of the present invention.

The amended Claim 14 provides an automatic gain controller including a first multiplexer, a second multiplexer, a filter, and a signal-energy processing device. The first multiplexer receives an input signal and a gain, and generates a first output. The second multiplexer receives a signal time constant and a gain time constant, and generates a second output. The filter is electrically connected to the first multiplexer and the second multiplexer, and generates one of a signal-energy and an actual gain in response to the first output and the second output, wherein the filter generates the signal-energy when said signal time constant modulates said input signal, and generates said actual gain when said gain time constant

modulates said gain. The signal-energy processing device is electrically connected to the filter, the first multiplexer and the second multiplexer for generating the gain and the gain time constant in response to the signal-energy.

Regarding the reference US 6,005,640, Strolle et al. disclose a receiver for demodulating both analog and digital television signals. The receiver includes a first multiplexer 906, a second multiplexer 946, a filter 910, and a quantizer 905 (interpreted as the signal-energy processing device of the present invention by Examiner). The first multiplexer 906 receives either an equalized complex signal (interpreted as the input signal of the present invention by Examiner) or a rotated symbol or retimed symbol samples (interpreted as the gain of the present invention by Examiner), and generates a first output. The second multiplexer 946 receives an imaginary component of a rotated error signal (interpreted as the gain time constant of the present invention by Examiner) or no signal (interpreted as the signal time constant of the present invention by Examiner), and generates a second output. The filter 910 is electrically connected to the first multiplexer and the second multiplexer, and generates a prefix signal (interpreted as the actual gain of the present invention by Examiner) for further generating the equalized complex signal in response to the first output and the second output. The quantizer 905 is electrically connected to the filter 910, the first multiplexer 906 and the second multiplexer 946 for generating the rotated symbol or retimed symbol samples and

the rotated error signal in response to a baseband signal derived from the equalized complex signal. However, the reference US 6,005,640 does not disclose the conditions for the filter 910 to determine which signal to generate. That is, one skilled in this field can not be taught that the filter generates a signal-energy when the signal time constant modulates the input signal and generates an actual gain when the gain time constant modulates the gain as recited in Claim 14 of the present invention.

In addition, the present invention is mainly applied to a voice transmission system and accomplishes the object of suppressing noise by adjusting the gain. However, the reference US 6,005,640 is mainly applied to a system for receiving and processing both analog television signals and digital television signals, and is not related to the noise suppression.

Therefore, it is apparent that the technical features of the amended Claim 14 of the present invention is so distinguished from the cited reference, and one skilled in the art can not easily anticipate the above-mentioned technical features of the amended Claim 14 of the present invention. Hence, the present independent Claim 14 indeed possesses the novelty and non-obviousness over the cited reference US 6,005,640.

Claim 17 is also patentable owing to its dependency from the patentable Claim 14.

The amended Claim 20 provides a gain controlling method for processing a signal-energy by means of a signal-energy processing device of an automatic gain controller and generating an actual gain in response to the signal-energy. The method includes steps of: a) comparing the signal-energy with a predetermined noise level; b) generating a first gain and a first time constant by means of the signal-energy processing device if the signal-energy is greater than the noise level; and c) generating a second gain and a second time constant by means of the signal-energy processing device if the signal-energy is less than or equal to the noise level, wherein the actual gain is calculated by an equation of one of said first time constant and said second time constant.

Regarding the reference US 6,397,177, Isabelle discloses a method for determining a speech-encoding rate (interpreted as the actual gain by Examiner) in a variable rate vocoder. The method includes steps of: (a) computing a signal energy value of an input signal; (b) determining a preliminary rate (interpreted as the first gain or the second gain of the present invention by Examiner) and a hangover interval (interpreted as the first time constant or the second time constant of the present invention by Examiner) by comparing the signal energy value with a plurality of energy thresholds (interpreted as the predetermined noise level by Examiner); and (c) determining said speech-encoding rate for a current frame by

modifying the preliminary rate by considering hangover constraints, a long term prediction gain and minimum and maximum rate constraints. It is disclosed that when a hangover is in progress ($h > 0$), the encoding rate of the current frame should be reset to full-rate and the hangover count should be decreased if the speech-encoding rate of the previous frame is full-rate and the encoding rate of the current frame is a lower rate. However, the reference US 6,397,177 does not disclose that the actual gain is calculated by an equation of one of said first time constant and said second time constant as recited in Claim 20 of the present invention.

The present invention is mainly applied to a voice transmission system and accomplishes the object of suppressing noise by adjusting the gain. However, the reference US 6,005,640 is mainly applied to determine a speech-encoding rate in a variable rate vocoder capable of encoding speech at several rates, and is not related to the noise suppression.

Therefore, it is apparent that the technical features of the amended Claim 20 of the present invention is so distinguished from the cited reference, and one skilled in the art can not easily anticipate the above-mentioned technical features of the present invention. Hence, the present independent Claim 20 indeed possesses the novelty and non-obviousness over the reference US 6,397,177.

Rejection under 35 U.S.C. §103

In the Office Action, Claims 1-5, 8, 10-11, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Strolle et al. in view of Rimini et al. (US 6,836,647); Claims 6-7, 9, 12 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Strolle et al. in view of Rimini et al., and further in view of Imanaka et al. (US 6,580,770), Sun (US 5,654,909), or Snell et al. (US 4,241,454); Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Strolle et al. in view of Sun; Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Strolle et al. in view of Snell et al..

After carefully reviewing the respective references US 6,005,640, US 6,836,647, US 6,580,770, US 5,654,909, and US 4,241,454, the applicant respectfully submits that those references do not disclose the technical features of the present invention.

The amended Claim 1 provides an automatic gain controller including a first multiplexer, a second multiplexer, a filter, a signal-energy processing device, and a multiplier. The first multiplexer receives an input signal and a gain and generates a first output. The second multiplexer receives a signal time constant and a gain time constant, and generates a second output. The filter is electrically connected to the first multiplexer and the second multiplexer, and generates one of a signal-energy and an actual gain in response to the first output and the second output,

wherein the filter generates the signal-energy when said signal time constant modulates said input signal, and generates said actual gain when said gain time constant modulates said gain. The signal-energy processing device is electrically connected to the filter, the first multiplexer and the second multiplexer for generating the gain and the gain time constant in response to the signal-energy. The multiplier is electrically connected to the filter for multiplying the actual gain by the input signal to generate an output signal.

Regarding the reference US 6,836,647, Rimini et al. disclose a device for estimating the power-level of a signal received at a mobile-station receiver operating in a wireless network according to a CDMA standard. The device includes an analog AGC loop, a digital AGC loop, a multiplier (interpreted as the multiplier of the present invention by Examiner) and an estimator. The analog AGC loop processes a received signal (interpreted as the input signal of the present invention by Examiner) and produces an analog-gain value. The digital AGC loop processes the received signal and produces a digital-gain value. The multiplier multiplies with each other the analog-gain value and the digital-gain value (interpreted as the actual gain of the present invention by Examiner) to produce a gain-value product (interpreted as an output signal of the present invention by Examiner). The estimator uses the gain-value product to produce an estimate of the received-signal power.

However, neither Rimini et al. nor Strolle et al. disclose that the filter generates a signal-energy when the signal time constant modulates the input signal and generates an actual gain when the gain time constant modulates the gain as recited in Claim1 of the present invention.

As two different gain time constants are provided for the first gain and the second gain, the automatic gain controller of the present invention can have a different convergent speed for each gain according to the demand of the controller (referring to Paragraph [0051] of the present specification).

Therefore, it is apparent that the technical features of the amended Claim 1 of the present invention is so distinguished from the cited references, and one skilled in the art can not easily anticipate the above-mentioned technical features of the present invention and the efficacy managed to result therefrom even by combining the above cited references. Hence, the present independent Claim 1 indeed possesses the novelty and non-obviousness over the cited references US 6,005,640 and US 6,836,647.

Claims 2-12 are also patentable owing to their dependency from the patentable Claim 1.

In addition, Claims 15-16 and 18-19 are also patentable owing to their dependency from the patentable Claim 14.

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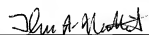
Conclusion

If the Examiner believes that any additional minor formal matters need to be addressed in order to place this application in condition for allowance, or that a telephone interview will help to materially advance the prosecution of this application, the Examiner is invited to contact the undersigned by telephone at the Examiner's convenience.

In view of the foregoing amendment and remarks, Applicants respectfully submit that the present application, including claims 1 - 24, is in condition for allowance and a notice to that effect is respectfully requested.

Respectfully submitted,

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